

Minnesota Energy Code:

*How We Got Here
Where We're Going*



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division of
energy
resources
Minnesota Department of Commerce

Who we are..

- **Minnesota Department of Commerce**
 - **Division of Energy Resources**
 - State Energy Office
 - **Providing energy information for over 35 years...**
 - Energy conservation, efficiency, & renewables
 - Through technology, analysis, grants, programs, & public outreach
 - Data, reports, publications, presentations, website, call center, training, public events

Today's Presentation

- **The MN residential market transformation**
- **How the MN energy code aided the transformation**
- **Concerns for states adopting the 2012 IECC**
 - **Residential**
 - **Commercial**

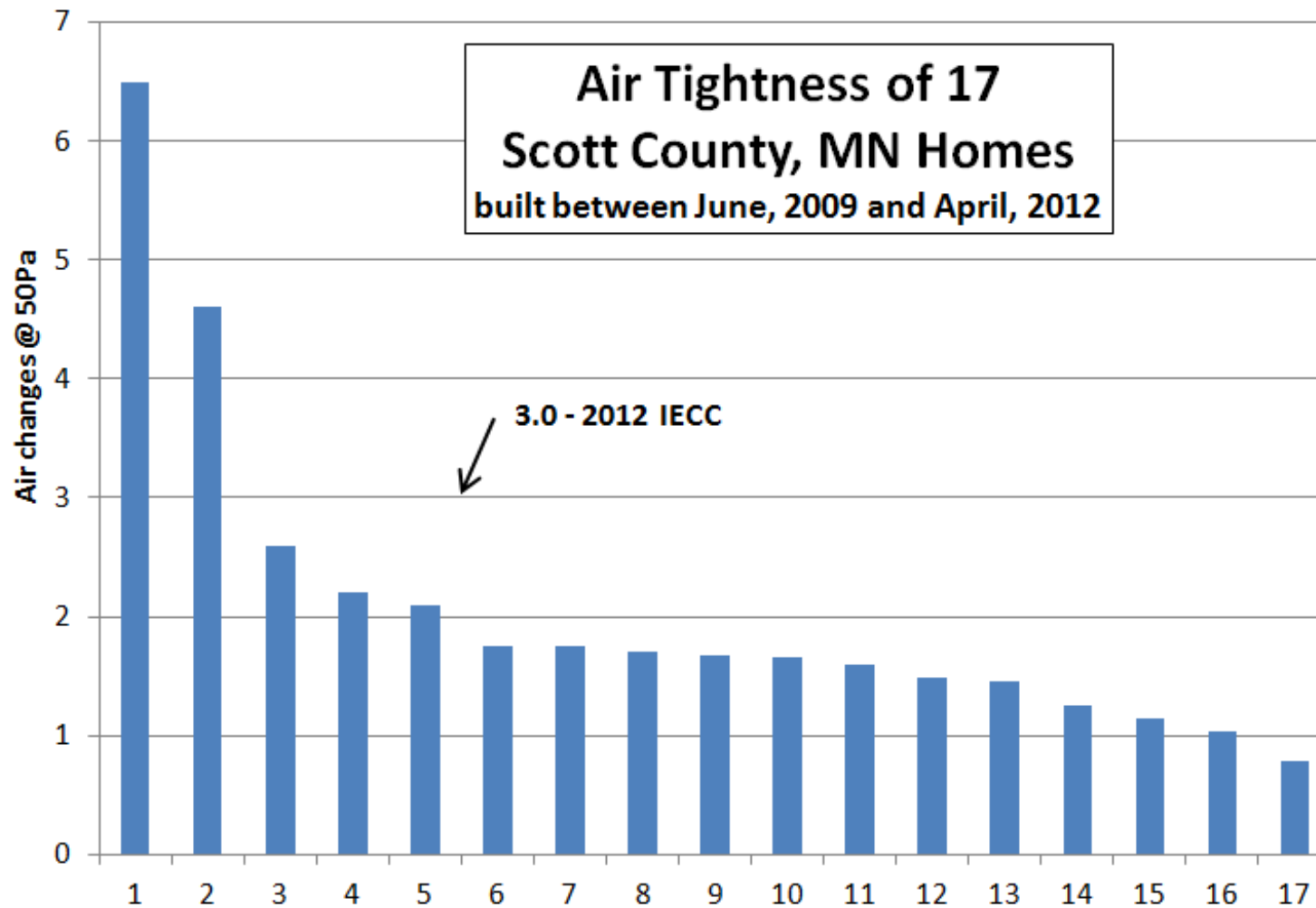
Minnesota Residential Market Transformation



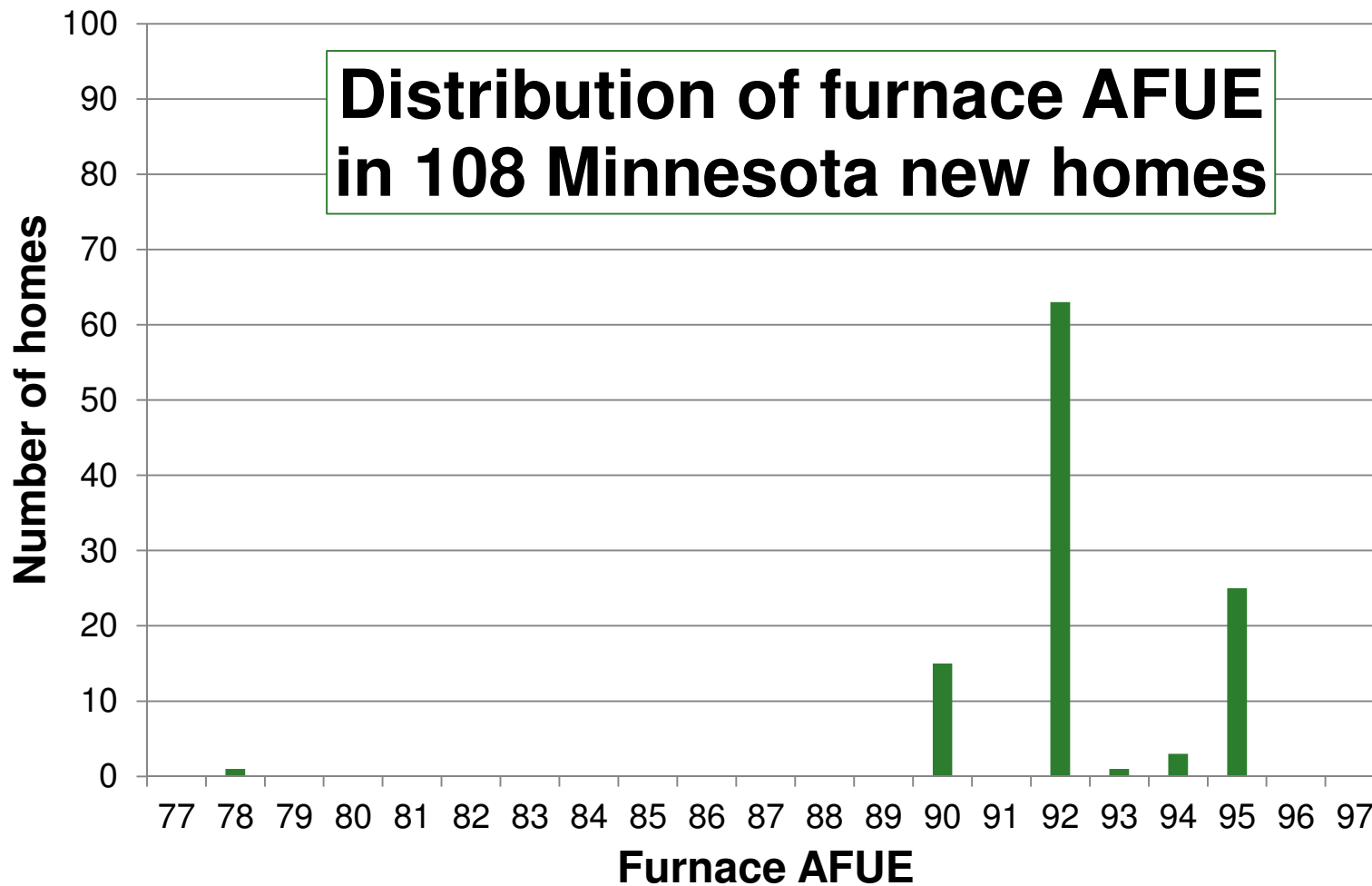
Minnesota New Homes Market

- **MN energy code major steps:**
 - In 2000 air sealing requirements
 - Updated in 2009 to ~2004 IECC
- **Builders demand high performance of subs**
- **Building officials demand compliance with air tightness**
- **Buyers demand high efficiency**

Minnesota New Home Performance



Minnesota New Home Performance



MN Residential Market Transformation

- **1981 Superinsulation demonstration project**
 - **Rochester MN Superinsulation Builders Conference**
 - **Formation of Energy Efficient (now Energy and Environmental) Builders Association**



The 80's and 90's

- **1984 research indicated air tightness is important**
- **Energy Code changes followed to require tighter construction**
- **Building science education**
 - **Sealing bypasses prevents ice dams**
 - **Air sealing is critical to stop moisture**

The 80's and 90's

- Sealing attic bypasses prevents ice dams
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The Late 90s

- **Builders understood need**
- **Building officials understood importance**
- **Builders demanding a level playing field**
- **Home buyers' expectations raised**

Residential Market Transformation

- **How can it be replicated in other states?**
 - **Teach building science**
 - Builders, building officials, architects/designers
 - **Show builders why improved construction reduces callbacks**
 - **Engage the industry in conversation**
 - They know construction better than you
 - **Create builder demand for a level playing field**

2012 IECC Residential Concerns



The 2000 MN Residential Energy Code

- **Air sealing laundry list**
 - Similar to current IECC
- **Mechanical ventilation**
- **Make up air required**
 - Simple choices
 - Not required if all vented appliances are sealed combustion

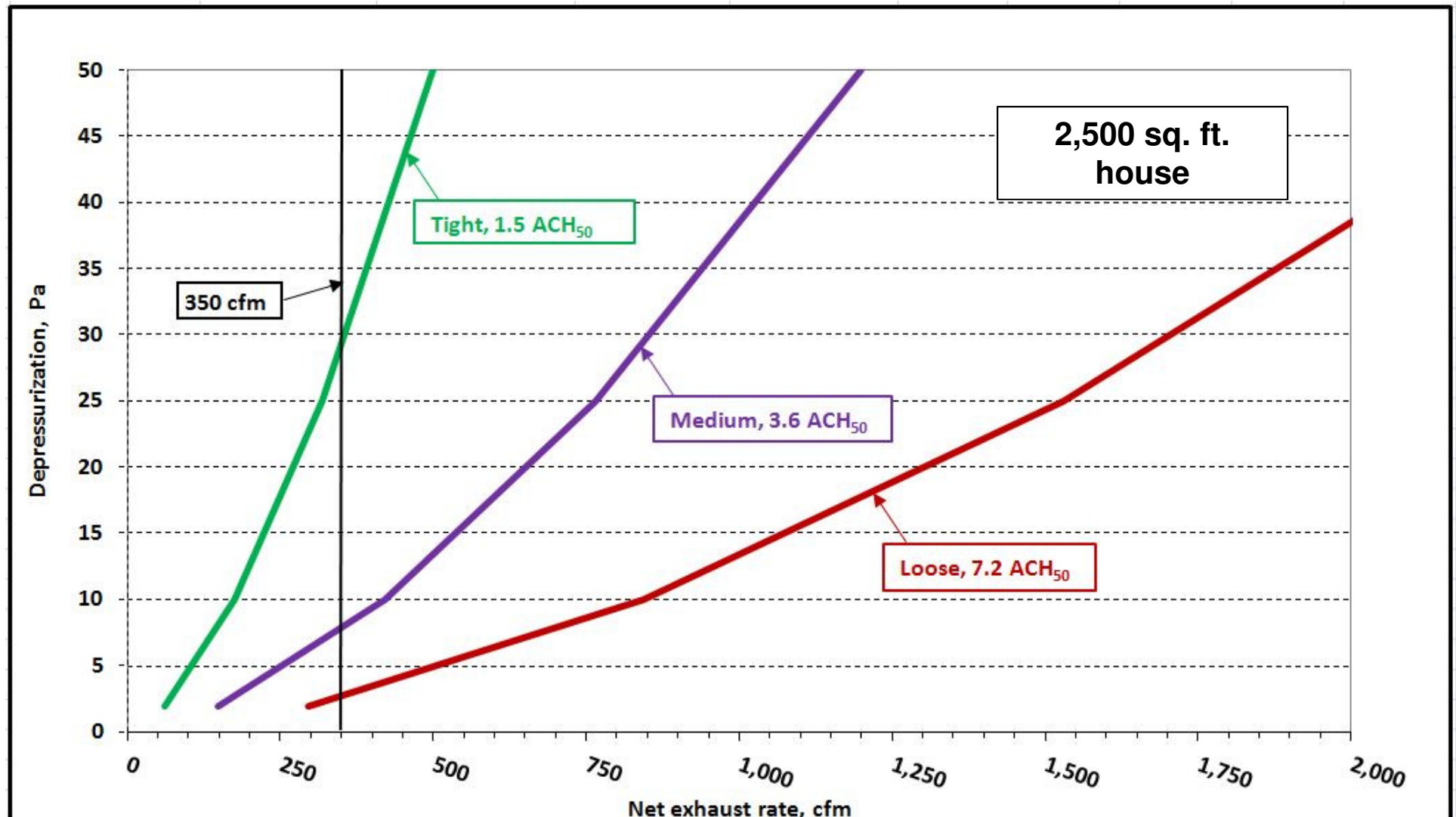
Most Controversy: Make-Up Air

- **Residential Ventilation Task Force**
 - Builders, building science experts, building officials
- **For the energy code:**
 - New homes will be 1.5 ACH₅₀
 - Simple choices
 - All builders chose to install sealed combustion vented appliances

Energy Code Assumptions

Path	Appliance	Depressurization tolerance
0	Direct vented appliance	50 Pascal
1	Closed controlled combustion wood burning appliances	7 Pascal
2	Atmospherically vented furnaces or boilers and decorative wood-burning appliance	5 Pascal
3	Atmospherically vented water heater	2 Pascal

Depressurization as a Function of Net Exhaust Rate



Foundation Wall Insulation



2009 MN Residential Energy Code

- **Air tightness requirements continued**
- **Make up air requirements moved to MN mechanical code**
- **Specific requirements for moisture protection of foundation wall insulation**

2014 MN Residential Energy Code

- **Trade off permitted (proposed):**
 - Will require only R-10 foundation wall insulation
 - Only when air tightness test is 2.6 ACH₅₀ or better
- **Energy performance equivalent**
- **Avoids difficult foundation wall details**

2012 IECC Residential Potential Issues

- **Make up air requirements**
 - Risk of backdrafting atmospheric vented appliances
- **Moisture protection of foundation wall insulation**
 - Risk of moisture problems for interior insulated walls

2012 IECC Commercial Concerns



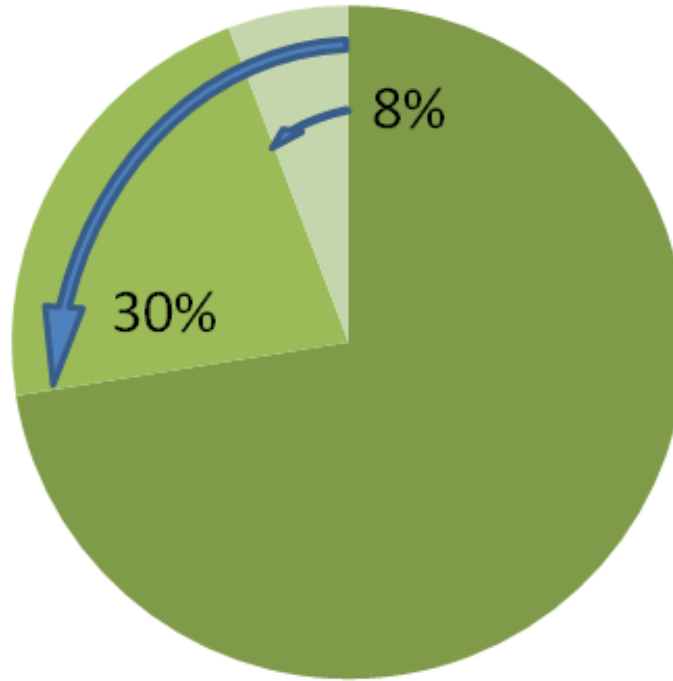
2012 IECC Commercial

- **Choice of either:**
 - 2012 IECC or
 - ASHRAE 90.1-2010
- **Introduction of mandatory:**
 - Acceptance testing (lighting) and
 - Commissioning (HVAC)

Importance of Commissioning

Whole Building Design Guide

Program of NIBS
June, 2012



“Building Commissioning Process can improve new building energy performance by 8% to 30%.”

Commissioning of Daylighting Controls Study

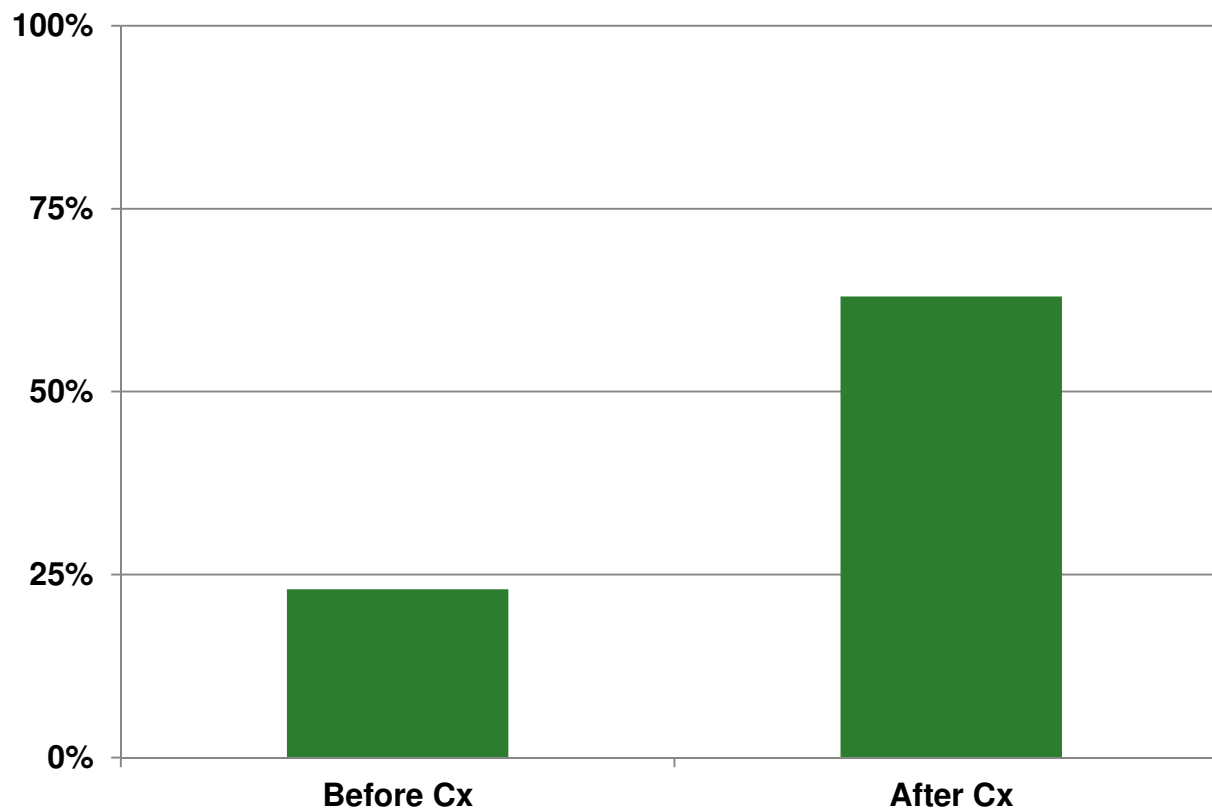
- **Energy Center of Wisconsin**
 - Feb, 2013 funded by MN utilities



Energy Center of Wisconsin

Commissioning of Daylighting Controls Study

- **Lighting Energy Saved by Daylighting Controls**





Lighting Controls Functional Testing

- **Required in both IECC and ASHRAE**
- **ASHRAE:**
 - Required testing identified
 - Must provide documentation
- **IECC:**
 - Required testing identified



HVAC Commissioning

- **ASHRAE does not require Cx**
 - Commissioning plan 
 - Only for buildings > 50,000 sq. ft.
- **IECC requires commissioning**
 - Section C408
 - Commissioning plan 
 - Preliminary Cx report
 - Final Cx report

Minnesota's Solution to Commissioning Issues

- **State amendments:**
 - **HVAC Commissioning**
 - **Must use IECC language for HVAC commissioning**
 - **Lighting functional testing**
 - **If IECC is used then must provide documentation**

Enforcing Commissioning Energy Code Requirements

- **Lighting functional testing**
 - Required testing and documentation should not be difficult
- **HVAC Commissioning**
 - Many elements will be clear-cut
 - Seasonally dependant elements could be very challenging
- **Important items to focus training**

Questions?



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